CLAIMS

1. A colloid solution of metal particles or metal compound particles comprising (1) metal particles or metal compound particles having an average particle diameter of 1-100 nm, (2) a water-soluble high molecular weight dispersant containing an N group, and (3) water and/or a water-soluble organic solvent, and having the following properties (a) and (b):

(a) exhibiting a change in the maximum absorption wavelength in the range from -2.0 nm to +2.0 nm before and after being stored at room temperature for 180 days at a constant pH in a range from pH4 to pH11 and

(b) exhibiting a change in the maximum absorption wavelength in the range from -2.0 nm to +2.0 nm before and after being stored at 50°C for one year at pH5.

2. The colloid solution according to claim 1, further comprising (4) a surfactant and/or a chelating agent.

3. The colloid solution according to claim 1 or 2, used with a porous cellulose membrane.

4. The colloid solution according to claim 3, comprising (4) at least a surfactant or a surfactant and a chelating agent.

5. The colloid solution according to claim 3 or 4, wherein the porous cellulose membrane is a virus removal membrane.

6. The colloid solution according to claim 1 or 2, which is a colloid solution of metal particles or metal compound particles further comprising (4) at least a chelating

agent, but not a surfactant, and is used with a porous membrane of synthetic polymer.

7. The colloid solution according to claim 6, wherein the porous membrane of synthetic polymer is a virus removal membrane and comprises a thermoplastic polymer of which the surface is hydrophilized.

8. The colloid solution according to claim 7, wherein the thermoplastic polymer is polyvinylidene fluoride or polyether sulfone.

9. The colloid solution according to any of claims 1 to 8, achieving a colloid recovery rate of 70% or more when the colloid solution is filtered through a collection test porous membrane and satisfying the following conditions:

(average pore diameter (nm) of the collection test porous membrane) - (average particle diameter (nm) of colloid) > 10 nm.

10. The colloid solution according to any of claims 1 to 9, wherein the particles in the colloid solution are metal particles alone.

11. The colloid solution according to any of claims 1 to 10, wherein the metal particles comprise at least one of gold, silver, platinum, rhodium, palladium, ruthenium, iridium, osmium, iron, and copper.

12. The colloid solution according to any of claims 1 to 11, wherein the percent of variation in the diameter distribution of the metal particles or the metal compound particles is 30% or less.

13. The colloid solution according to any of claims 1 to 12, containing metal

particles or metal compound particles having an average particle diameter of 15 to 40 nm and the percent of variation in the particle diameter distribution of 27% or less.

14. The colloid solution according to any of claims 1 to 13, wherein the N group is a pyrrolidone group.

15. The colloid solution according to any of claims 1 to 14, wherein the water-soluble high molecular weight dispersant containing the N group is poly(vinylpyrrolidone) or a poly(vinylpyrrolidone) copolymer.

16. The colloid solution according to any of claims 2 to 5 and claims 9 to 15, wherein the surfactant is a nonionic surfactant or an anionic surfactant.

17. The colloid solution according to any of claims 2 to 5 and claims 9 to 16, wherein the surfactant is dodecylsulfuric acid or its salt.

18. The colloid solution according to any of claims 2 to 17, wherein the chelating agent comprises at least one of tripolyphosphoric acid, polyacrylic acid, polyacrylic acid copolymer, ethylenediaminetetraacetic acid, and salts thereof.

19. A method for producing a colloid solution of metal particles or metal compound particles, in which the colloid solution comprise at least

(1) metal particles or metal compound particles having an average particle diameter of 1-100 nm, (2) a water-soluble high molecular weight dispersant containing an N group, and (3) water and/or a water-soluble organic solvent, and has the following properties (a) and (b):

(a) exhibiting a change in the maximum absorption wavelength in the range from

-2.0 nm to +2.0 nm before and after being stored at room temperature for 180 days at a constant pH in a range from pH4 to pH11 and

(b) exhibiting a change in the maximum absorption wavelength in the range from -2.0 nm to +2.0 nm before and after being stored at 50°C for one year at pH5,

characterized in that the method comprises adding a water-soluble high molecular weight dispersant containing an N group to the colloid solution of metal particles or metal compound particles, and further adding a surfactant and/or a chelating agent.

20. The method for producing a colloid solution according to claim 19, comprising dissolving a metal compound in a solvent, causing the metal particles to form by reducing the metal compound, then adding a water-soluble high molecular weight dispersant containing an N group, and further adding a surfactant and/or a chelating agent.

21. An adsorption preventive agent capable of preventing metal particles or metal compound particles in a colloid solution containing metal particles or metal compound particles from being adsorbed on a porous membrane, in which the colloid solution comprises (1) a water-soluble high molecular weight dispersant containing an N group and/or (2) a surfactant and/or a chelating agent as effective components.

22. An adsorption preventive agent capable of preventing metal particles or metal compound particles in a colloid solution containing metal particles or metal compound particles from being adsorbed on a porous membrane, characterized in that the colloid solution contains at least (1) metal particles or metal compound particles having an average particle diameter of 1-100 nm, (2) a water-soluble high molecular weight dispersant containing an N group, and (3) water and/or a water-soluble organic solvent, and has the following properties (a) and (b):

(a) exhibiting a change in the maximum absorption wavelength in the range from -2.0 nm to +2.0 nm before and after being stored at room temperature for 180 days at a constant pH in a range from pH4 to pH11 and

(b) exhibiting a change in the maximum absorption wavelength in the range from -2.0 nm to +2.0 nm before and after being stored at 50°C for one year at pH5.

23. The adsorption preventive agent according to claim 21 or 22, wherein the porous membrane is a cellulose-type porous membrane and a virus removal membrane.

24. The adsorption preventive agent according to claim 21 or 22, wherein the porous membrane is a virus removal membrane made from a synthetic polymer and the colloid solution does not contain a surfactant.

25. An adsorption preventive method capable of preventing metal particles or metal compound particles in a colloid solution containing metal particles or metal compound particles from being absorbed on a porous membrane, in which the colloid solution contains (1) a water-soluble high molecular weight dispersant containing an N group and/or (2) a surfactant and/or a chelating agent as effective components.

26. An adsorption preventive method capable of preventing metal particles or metal compound particles in a colloid solution containing metal particles or metal compound particles from being absorbed on a porous membrane, characterized in that the colloid solution contains at least (1) metal particles or metal compound particles having an average particle diameter of 1-100 nm, (2) a water-soluble high molecular weight dispersant containing an N group and (3) water and/or a water-soluble organic solvent, and the colloid solution has the following properties (a) and (b):

(a) exhibiting a change in the maximum absorption wavelength in the range from

-2.0 nm to +2.0 nm before and after being stored at room temperature for 180 days at a constant pH in a range from pH4 to pH11 and

(b) exhibiting a change in the maximum absorption wavelength in the range from -2.0 nm to +2.0 nm before and after being stored at 50°C for one year at pH5.

27. The adsorption preventive method according to claim 25 or 26, wherein the porous membrane is a cellulose-type porous membrane and a virus removal membrane.

28. The adsorption preventive method according to claim 25 or 26, wherein the porous membrane is a virus removal membrane made from a synthetic high molecular weight compound and the colloid solution does not contain a surfactant.

29. An integrity test method of a virus removal membrane comprising causing a colloid solution of metal particles or metal compound particles to be filtered through the virus removal membrane which was used for virus removal, in which the colloid solution contains at least

(1) metal particles or metal compound particles having an average particle diameter of 1-100 nm,

(2) a water-soluble high molecular weight dispersant containing an N group, and

(3) water and/or a water-soluble organic solvent, and

has the following properties (a) and (b):

(a) exhibiting a change in the maximum absorption wavelength in the range from -2.0 nm to +2.0 nm before and after being stored at room temperature for 180 days at a constant pH in a range from pH4 to pH11 and

(b) exhibiting a change in the maximum absorption wavelength in the range from -2.0 nm to +2.0 nm before and after being stored at 50°C for one year at pH5.